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Patent

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Shigemasa TAKAGI
Serial No.:	PCT/JP00/09334
Filing Date:	December 27, 2000
Title:	Rubber Coated Strands; Belt, Ply, and Tire Using Rubber Coated Strands; and Apparatus and Method for Manufacturing Them
Attorney Docket No.:	CONDA.00001

PRELIMINARY AMENDMENT

Submitted by:

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In the specification

On page 1, line 1, delete the heading "SPECIFICATION".

On page 1, line 6, delete the heading "TECHNICAL FIELD" and replace it with the following:

"BACKGROUND OF THE INVENTION"

On page 1, line 23, delete the heading "BACKGROUND ART".

On page 4, line 30, delete the heading "DISCLOSURE OF THE INVENTION and replace it with the following:

"SUMMARY OF THE INVENTION"

On page 13, line 23, delete the heading "BEST MODE FOR CARRYING OUT THE INVENTION" and replace it with the following:

"DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS"

Please rewrite the paragraph beginning on page 17, line 7 as follows:

Accordingly, since each filament 41a is twisted equally, each filament 41a supports an external force equally. Therefore, it is not necessary to provide the strand 41 with more than an expected level of strength. The strand 41 is provided with a predetermined strength against external force. Thus, the weight of a resulting tire is reduced. The rubber membrane coated strand 59, in which the filaments 41a of the strand 41 and the rubber are adequately adhered, is obtained. Also, the entire strand 41 is coated with the rubber membrane layer 58 after each filament 41a is coated with the rubber layer 53, which leaves no space between the filaments. Thus, as shown in Figures 12(a)-12(d), there is no space between the filaments 41a of the strand 41. Accordingly, water does not penetrate the strand 41. Thus, the invention provides an improved corrosion-resistant rubber coated strand. Further, since the filaments 41a are separated by the rubber layer 53, the strand absorbs vibration. The strand also suppresses frictional heating

produced by direct contact between the filaments 41a.

Please rewrite the paragraph beginning on page 32, line 9 as follows:

As shown in Fig. 24 (a), the forming drum 105 rotates by a predetermined angle so that the opening 105a of the forming drum 105 is at the top. The opening 105a is where the leading and the trailing end of the cylindrical wound body 98 meet each other. In this state, as shown in Figs. 24 (b) and 24 (c), the seaming apparatus 106 moves along the opening 105a of the forming drum 105. The seaming apparatus 106 joins the start and the end of winding of the cylindrical wound body 98 so that the body ply is manufactured.

Please rewrite the paragraph beginning on page 35, line 6 as follows:

Thus, according to the seventh embodiment, the following advantages are provided in addition to the advantages (1) to (4), (6), and (7) of the above embodiments.

In the claims

Prior to calculating the filing fee, please cancel claims 1-25 and add new claims 26-45 as follows:

26. A method of forming a coated strand comprising:
separating filaments of a twisted multi-filament strand from one another to form a space between the filaments;
coating each filament with liquid rubber material when the filaments are separated; and
re-twisting the filaments to reform the strand.

27. The method of claim 26 including applying a primer coating to the filaments prior to the coating step.

28. The method of claim 26 including applying a second coating of rubber material to the re-twisted strand.

29. The method of claim 28, wherein the second coating is applied by extrusion molding.

30. The method of claim 27, wherein the strand is one of a plurality of identical strands, and the method includes:

arranging the strands into a parallel group such that the axes of the strands are substantially in the same plane; and

applying a second rubber coating to the group to form a ribbon.

31. The method of claim 30, wherein the second rubber coating is extrusion molded to the strand.

32. The method of claim 30 including:

wrapping the ribbon around an object tightly such that the ribbon is adhered to itself by cohesion to form a unitary tubular body; and

cutting the body to form a sheet of material.

33. The method of claim 32 including forming part of a tire with the sheet of material.

34. An apparatus for untwisting a strand of twisted filaments comprising a rotor, which has a central axis about which the rotor can rotate, wherein the rotor includes a plurality of separate passages, and filaments of the strand are fed through the passages, wherein the rotor separates the filaments from one another and produces a space between the filaments.

35. The apparatus according to claim 34, wherein the passages are parallel to the axis.

36. The apparatus according to claim 34, wherein the rotor is one of a plurality of identical rotors and the strand is one of a plurality of identical strands, and the rotors untwist the strands, respectively.

37. The apparatus according to claim 34, wherein a drive mechanism is provided for rotating the rotor about the axis.

38. The apparatus according to claim 34, wherein the rotor is one of a plurality of coaxial rotors for separating the filaments of the strand.

39. A strand coating apparatus comprising:

a strand separator mechanism, which includes a plurality of separate passages through which individual filaments of a strand pass to untwist the strand and to separate the filaments from one another, wherein the

strand is re-twisted after passing through the strand separator mechanism;

a first coating device for applying a first rubber coating to the filaments while the filaments are separated;

a second coating device for applying a second rubber coating to the strand after the filaments have been coated by the first coating device and after the strand is re-twisted.

40. The apparatus of claim 39, wherein the second coating device is an extruder.

41. The apparatus of claim 39, wherein the separator mechanism is one of a plurality of identical separator mechanisms, and each separator mechanism separates the filaments of one of a plurality of strands that are coated in a parallel manner by the apparatus.

42. The apparatus of claim 41, wherein the second coating apparatus forms a ribbon in which the strands are parallel.

43. A strand coating apparatus comprising:

a strand separator means for separating and untwisting the filaments of a multi-filament, twisted strand from one another, wherein the strand is re-twisted after passing through the strand separator means;

a first coating means for applying a first rubber coating to the separated filaments;

a second coating means for applying a second rubber coating to the strand after the filaments have been coated by the first coating means and after the strand is re-twisted.

44. The apparatus according to claim 43 wherein the first coating means is a reservoir of liquid rubber material.

45. The apparatus of claim 43, wherein the second coating means is an extruder.

Remarks

The claims have been rewritten to eliminate multiple claim dependency and to use US-style claims. The specification has been amended to include US-style headings and to correct minor errors.

Appendix (showing changes to the specification)

The paragraph beginning on page 17, line 7 was modified as follows:

Accordingly, since each filament 41a is twisted equally, each filament 41a supports an external force equally. Therefore, it is not necessary to provide the strand 41 with more than an expected level of strength. The strand 41 is provided with a predetermined strength against external force. Thus, the weight of a resulting tire is reduced. The rubber membrane coated strand 59, in which the filaments 41a of the strand 41 and the rubber are adequately adhered, is obtained. Also, the entire strand 41 is coated with the rubber membrane layer 58 after each filament 41a is coated with the rubber layer 53, which leaves no space between the filaments. Thus, as shown in [Fig. 12] Figures 12(a)-12(d), there is no space between the filaments 41a of the strand 41. Accordingly, water does not penetrate the strand 41. Thus, the invention provides an improved corrosion-resistant rubber coated strand. Further, since the filaments 41a are separated by the rubber layer 53, the strand absorbs vibration. The strand also suppresses frictional heating produced by direct contact between the filaments 41a.

The paragraph beginning on page 32, line 9 was modified as follows:

As shown in Fig. 24 (a), the forming drum 105 rotates by a predetermined angle so that the opening 105a of the forming drum 105 is at the top. The opening 105a is where the leading and the trailing end of the cylindrical wound body 98 meet each other. In this state, as shown in Figs. 24 (b) and 24 (c), the seaming apparatus 106 moves along the opening 105a of the forming drum 105. The seaming apparatus 106 joins the start and the end of winding of the cylindrical wound body [105] 98 so that the body ply is manufactured.

The paragraph beginning on page 35, line 6 was modified as follows:

Thus, according to the [sixth] seventh embodiment, the following advantages are provided in addition to the advantages (1) to (4), (6), and (7) of the above embodiments.